



COVID-19

for Severe COVID-19

Updated Oct. 14, 2021

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For more information, please see [Underlying Medical Conditions Associated with Higher Risk for Severe COVID-19: Information for Healthcare Providers](#) and the [People with Certain Medical Conditions](#) webpage, which is intended for the general public.

Summary of Recent Changes

Updates as of October 14, 2021



Updates to the list of underlying medical conditions that put adults of any age at higher risk for severe illness from the virus that causes COVID-19 were based on evidence from published reports, scientific articles in press, unreviewed pre-prints, and internal data. Updates to the following conditions were completed based on evidence from the date range below:

- Chronic lung disease (including bronchiectasis, bronchopulmonary dysplasia, interstitial lung disease, pulmonary hypertension, pulmonary embolism, tuberculosis) and chronic liver disease (including cirrhosis, non-alcoholic fatty liver disease, alcoholic liver disease, and autoimmune hepatitis) were added September 2021 based on evidence published between December 1, 2019 and August 31, 2021 using the updated review methods outlined below.
- Mental health disorders (such as mood disorders including depression, and schizophrenia spectrum disorders) were added September 2021 based on evidence published between December 1, 2019 and August 31, 2021.
- No conditions were removed from the previous underlying medical conditions list.

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Context

Based on available literature and data from CDC-led investigations, we continue to learn more about COVID-19 and associated underlying medical conditions that put adults at higher risk of severe illness. Severe illness from COVID-19 is defined here as hospitalization, admission to the intensive care unit (ICU), intubation or mechanical ventilation, or death. Evidence used to inform this list was determined by CDC reviewers based on available evidence about COVID-19 at time of review.

The methods used to assess underlying medical conditions have changed during the pandemic as the amount of literature and types of studies grow. For instance, preliminary versions of this list focused on providing the latest information based on available data. As the literature grew, CDC investigators updated the list to include studies from May 2021, the

descriptive data. As the literature grew, CDC investigators categorized the literature by study design. Since May 2021, the process has been updated to include a CDC review process that uses rigorous systematic review methods.

Overview

Conditions on this list have been shown to be associated with severe illness from COVID-19. This **list might change** and, upon review as the science evolves, CDC might update it.

Since May 2021, CDC conducted systematic reviews on certain underlying medical conditions and those conditions previously categorized as having mixed evidence. These reviews are ongoing. As we complete a review, we will update the list. These underlying medical conditions are based on published reports, scientific articles in press, unreviewed pre-prints, and data from CDC-led investigations. Conditions were categorized by the type of study design in order of scientific rigor:

- **Supported by meta-analysis/systematic review:** Defined as having a significant association in at least one meta-analysis or systematic review, including reviews completed at CDC.
- **Supported by mostly cohort, case-control, or cross-sectional studies:** Defined as having a statistically significant association in at least one observational study (i.e., cohort, case-control or cross-sectional studies); may include systematic review or meta-analysis that represents one condition in a larger group of conditions (for example, kidney transplant under the category of solid organ or blood stem cell transplantation).
- **Supported by mostly case series, case reports or, if other study design, the sample size is small (and no systematic review or meta-analysis were available to review):** Defined as having a statistically significant association in one or more case series studies. If there are cohort or case-control studies, sample sizes were small. Conditions included may be rare.
- **Supported by mixed evidence:** Defined as having a statistically significant association in at least one meta-analysis or systematic review and additional studies or reviews that reached different conclusions about risk associated with a condition.

Table of Evidence

Evidence used to inform the list of underlying medical conditions that increase a person’s risk of severe illness from COVID-19. In alphabetic order by section.

Tier	Condition	Evidence of Impact on COVID-19 Severity [Reference number]
Supported by meta-analysis/systematic review	Bronchiectasis	Select reference from systematic review [1, 2]
	Bronchopulmonary dysplasia	Select reference from systematic review [3]
	Pulmonary hypertension and pulmonary embolism	Select reference from systematic review [4, 5]
	Cancer	Systematic Review [6, 7] Cohort Study [8-10] Case Series [11-13] Case Control Study [14]
	Cerebrovascular disease	Meta-Analysis [15-18] Synthesis of Evidence [19] Cohort Study [20-22]
	Chronic kidney disease	Meta-Analysis [18, 23] Cohort Studies [21, 24-45], {46}* Case Series [47-49]
	Chronic liver disease (cirrhosis, non-alcoholic fatty liver disease, alcoholic liver disease, autoimmune hepatitis)	Meta-Analysis [50-54] Cohort [24, 33, 47, 55-69] Case-Control [70-75] Cross sectional [76] Case Series [77-79]
	COPD	Meta-Analysis [80-82] Systematic Review [83, 84]
	Diabetes mellitus, type 1	Meta-Analysis [85] Case Series [48] Cohort Study [20, 86-91]

Tier	Condition	Evidence of Impact on COVID-19 Severity [Reference number]
	Diabetes mellitus, type 2	Meta-Analysis [92] Systematic Review {93}* Gestational Diabetes Systematic Review {94}* Case Series [48] Longitudinal Study [95] Cohort Study [85, 89, 95-100]
	Heart conditions (such as heart failure, coronary artery disease, or cardiomyopathies)	Meta-Analysis [101-103] Cohort Study [20, 21]
	Interstitial lung disease	Select reference from systematic review [1, 4, 5, 104]
	Smoking, current and former	Meta-Analyses [80, 102, 105-112]
	Tuberculosis	Select reference from systematic review [113-115]
	Obesity	Meta-Analysis [116-118] Systematic Review {93}* Cohort [29, 119-127], {46, 128-131}*
	Pregnancy and Recent Pregnancy	Systematic Review [93, 132] Case Control [133, 134] Case Series [135-137] Cohort Study [138-141]
	Mental health disorders (mood disorders, including depression, and schizophrenia spectrum disorders)	Meta-analysis [142, 143]
Supported by mostly cohort, case-control, or cross-sectional studies (if there is a systematic review or meta-analysis available, it represents one condition in a larger category of conditions)	Children with certain underlying conditions	Systematic Review [144, 145] Cross-Sectional Study [146-148] Cohort Study [149-157] Case Series [158, 159]
	Down syndrome	Cohort Study [160, 161]
	HIV	Cohort Study [37, 162-164] Case Series [165-167]
	Neurologic conditions	Review [168] Cross-Sectional Study [146] Cohort Study [21, 149]
	Overweight	Cohort Study [122] Case Series [127]
	Sickle cell disease	Cohort [158, 159, 169, 170] Case Series [158, 170-185]
	Solid organ or blood stem cell transplantation	Meta-Analysis [125] Case Series [186-197] Cohort [198]
	Substance use disorders	Case-Control Study [199-201] Cohort Study [202, 203]
	Use of corticosteroids or other immunosuppressive medications	Cohort Study [204] Cross Sectional [205] Case Series [206-208]
Supported by mostly case series, case reports or, if other study design, the sample size is small (and no systematic review or meta-analysis available were reviewed)	Cystic fibrosis	Case Series [209-211] Cohort [212]
	Thalassemia	Case Series [213-216] Cross Sectional [217]
Supported by mixed evidence	Asthma	Meta-Analysis [218-220] Review [221] Case Series [222] Cohort Study [21, 45, 223-228]
	Hypertension, possibly	Meta-Analysis [102, 229-232] Systematic Review [233], {93}* Cohort Study [20, 21, 24, 225, 234-240] Case Series [241]

Tier	Condition	Evidence of Impact on COVID-19 Severity [Reference number]
	Immune deficiencies	Meta-Analysis [242] Cohort [243-245] Case Series [186, 187, 195, 246-249]

Footnote: { }* indicates pregnancy-related reference.

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See All References

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Previous Updates

Updates from Previous Content



As of May 13, 2021

- Pregnancy related references were added in May 2021.
- Substance use disorders were based on evidence published between December 1, 2019 and January 1, 2021.
- Asthma, blood disorders, cancer, cerebrovascular disease, chronic obstructive pulmonary disease (COPD), chronic kidney disease (CKD), cystic fibrosis, diabetes, Down syndrome, heart disease, hypertension, immunosuppressant medications, use of corticosteroids or other immunosuppressive medications, solid organ or blood stem cell transplantation, neurological conditions, and obesity were based on evidence published between December 1, 2019 and December 1, 2020.
- Smoking was based on evidence published between December 1, 2019 and July 20, 2020.